



# Status of Lynx In Maine

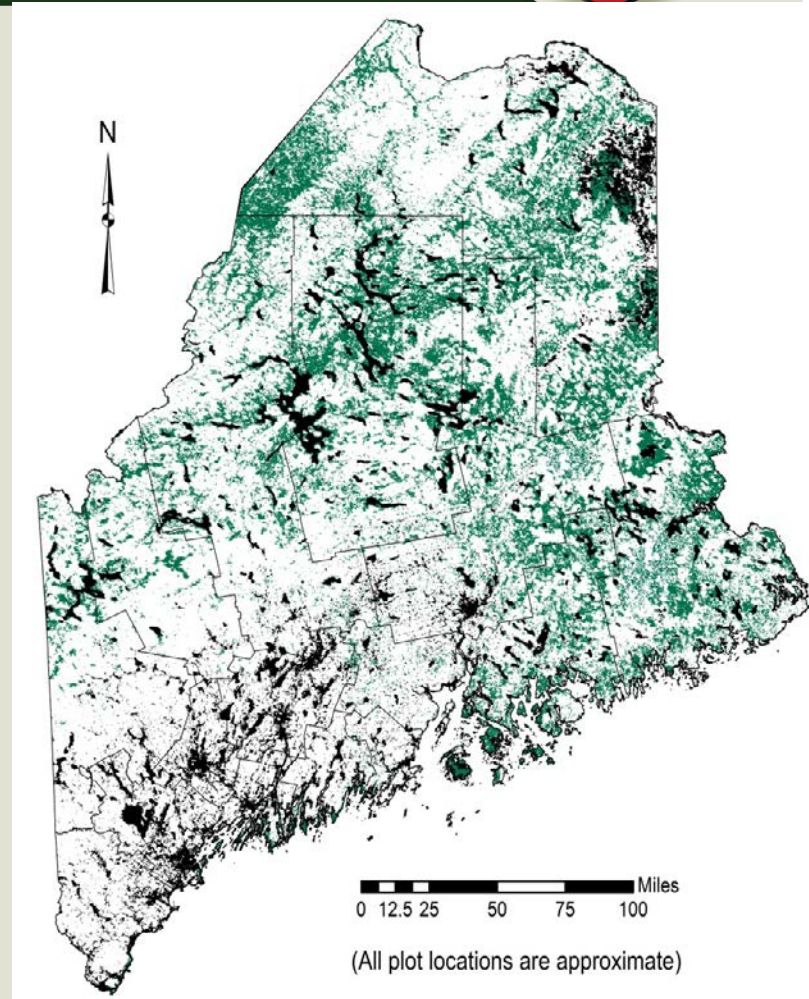




# Maine's Forest – contiguous forestland



- ~18 million acres of forest
  - 6 mill acres spruce/fir
- Privately owned–forest mgmt.
- Limited development pressures
- Easements on 2.5 million acres
  - Protected from development
  - Active forest management



Distribution of spruce/fir forest type group, Maine 2012  
(Homer et al. 2012)



# 1970-85 Budworm Outbreak





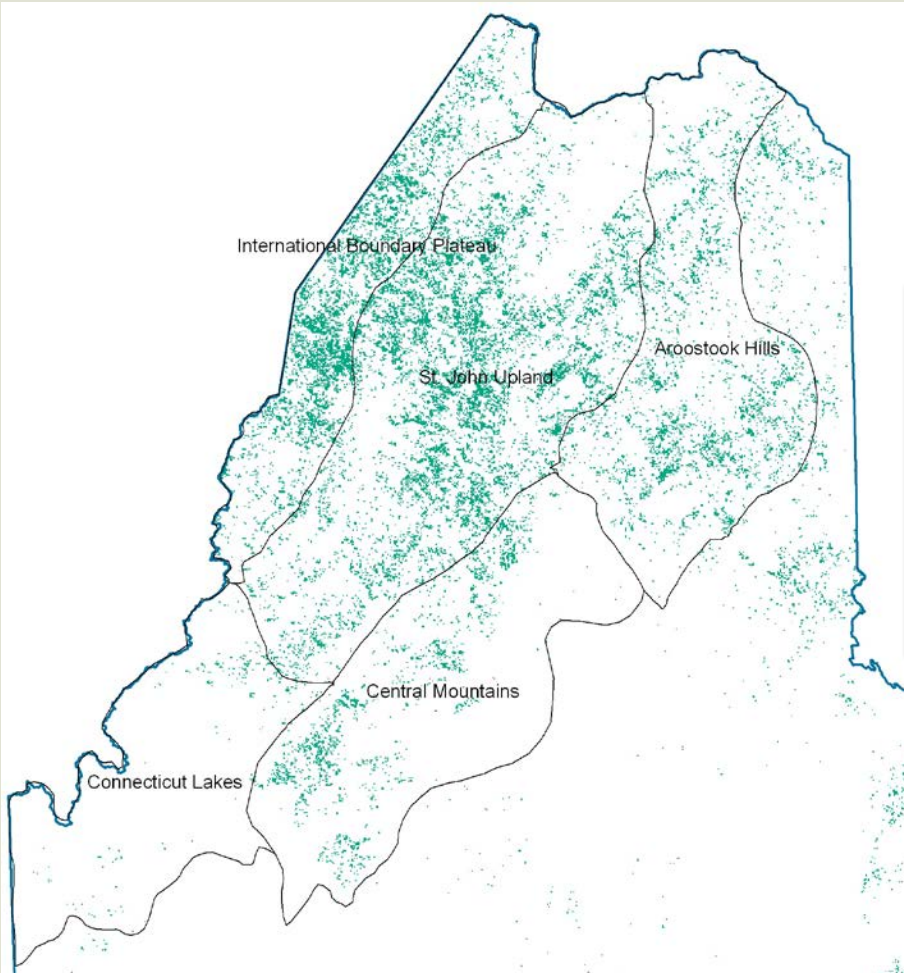


# 1990s – Today Extensive Areas of Regenerating Forest





# Forest Conditions–Forest Inventory Data



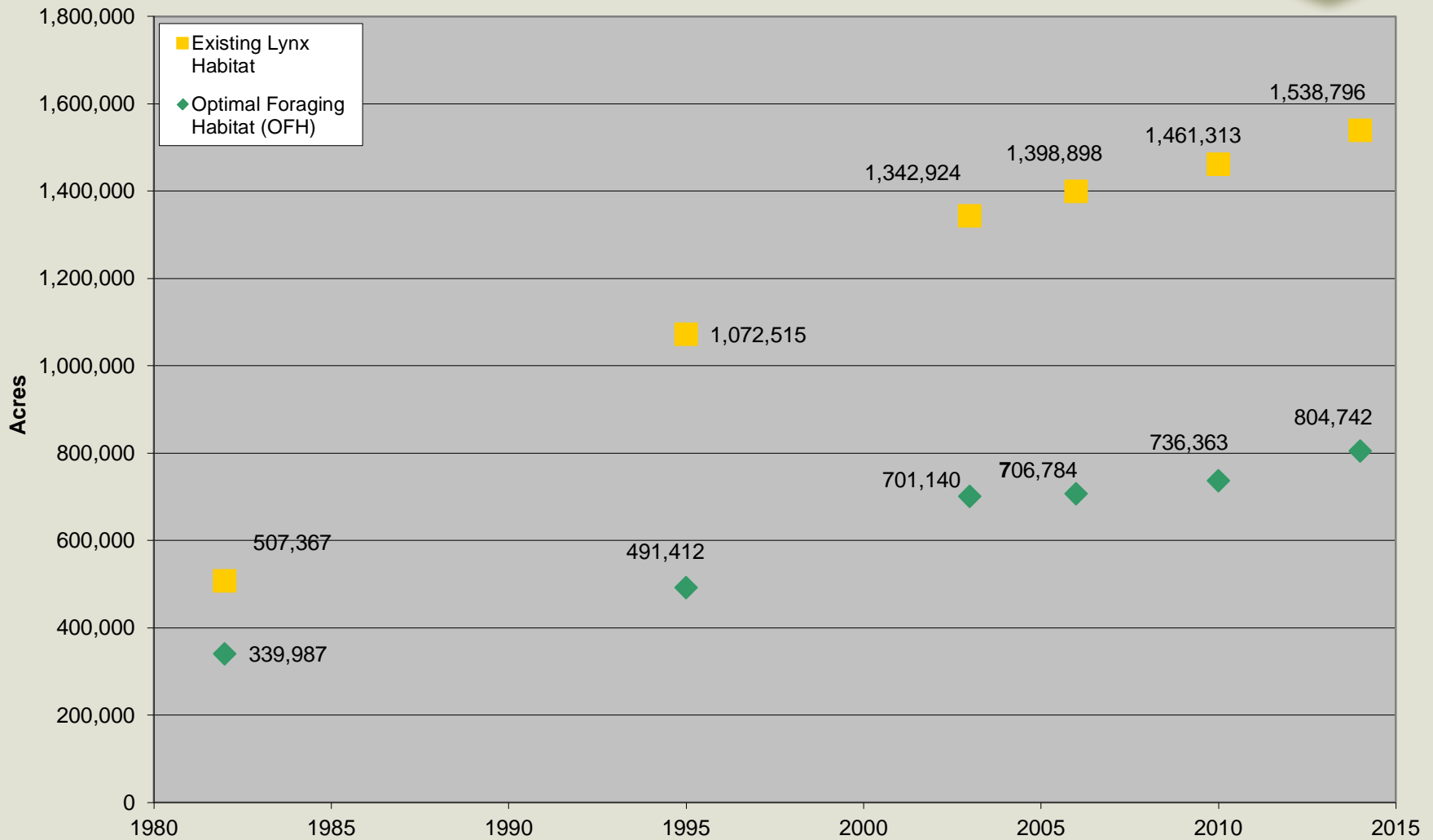
3 million of acres of S/F forest

	Sapling	Dense
1982	½ million	340,000
1995	1 million	½ million
2006	1.4 million	700,000

Source: Maine Forest Service – Ken Laustsen



# Forest Inventory UPDATE 2014





# Monitoring Lynx in Maine



1. Radio Telemetry Study: 1999–2011
2. Periodic Winter Snow Track Surveys
  - 1995–98, 2003–2008, 2015–2017
3. Credible Sightings – MDIFW Staff
4. Incidental Take

# Radio Telemetry Study: 1999–2011

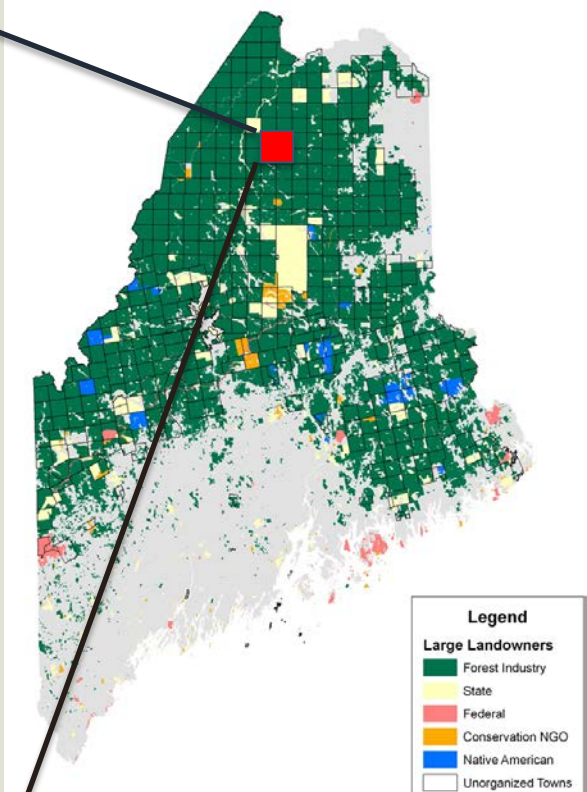
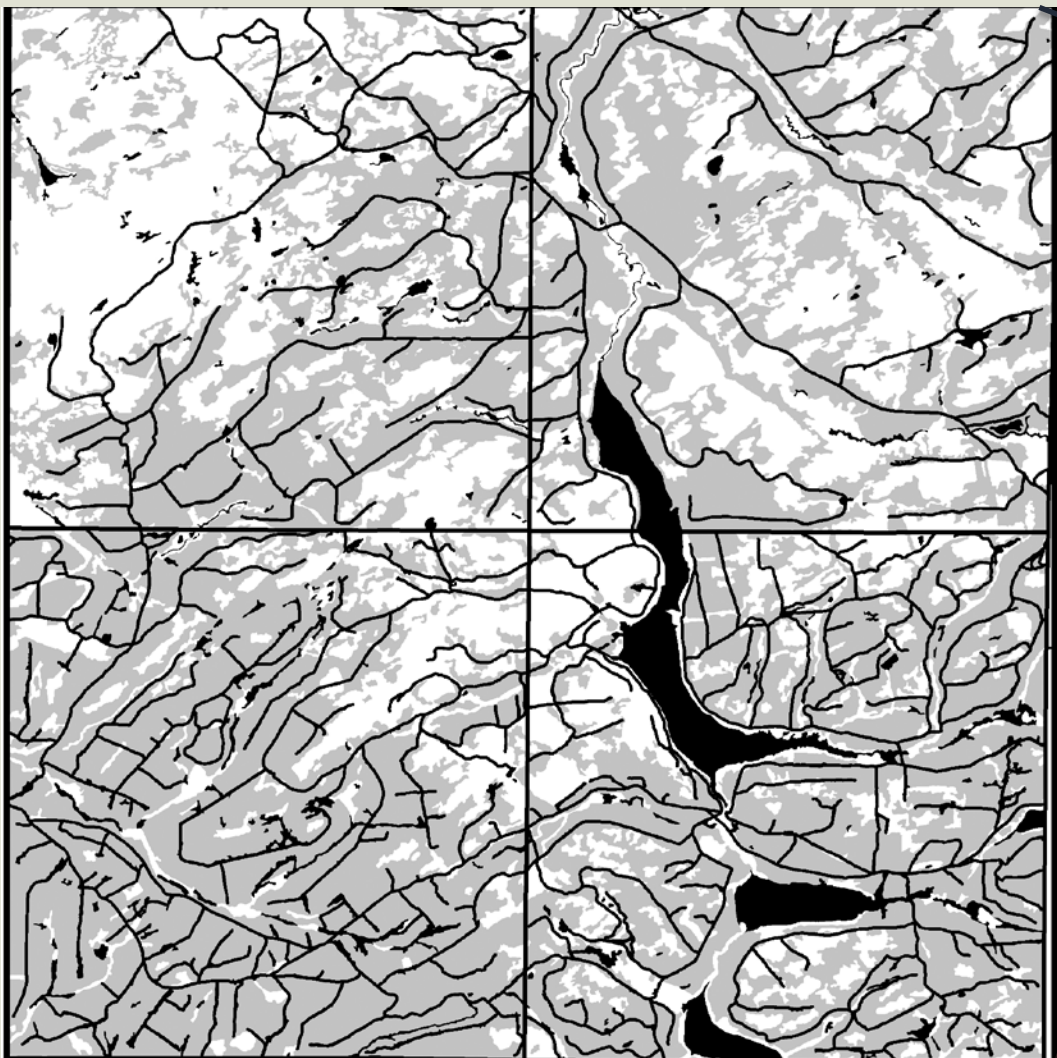


- Captured 191 lynx
  - 113 kittens in 43 litters
  - 85 radioed
- Occupy small home ranges
- Lynx select best habitats
- Good reproduction and survival





# Radio Telemetry Study: 1999–2011

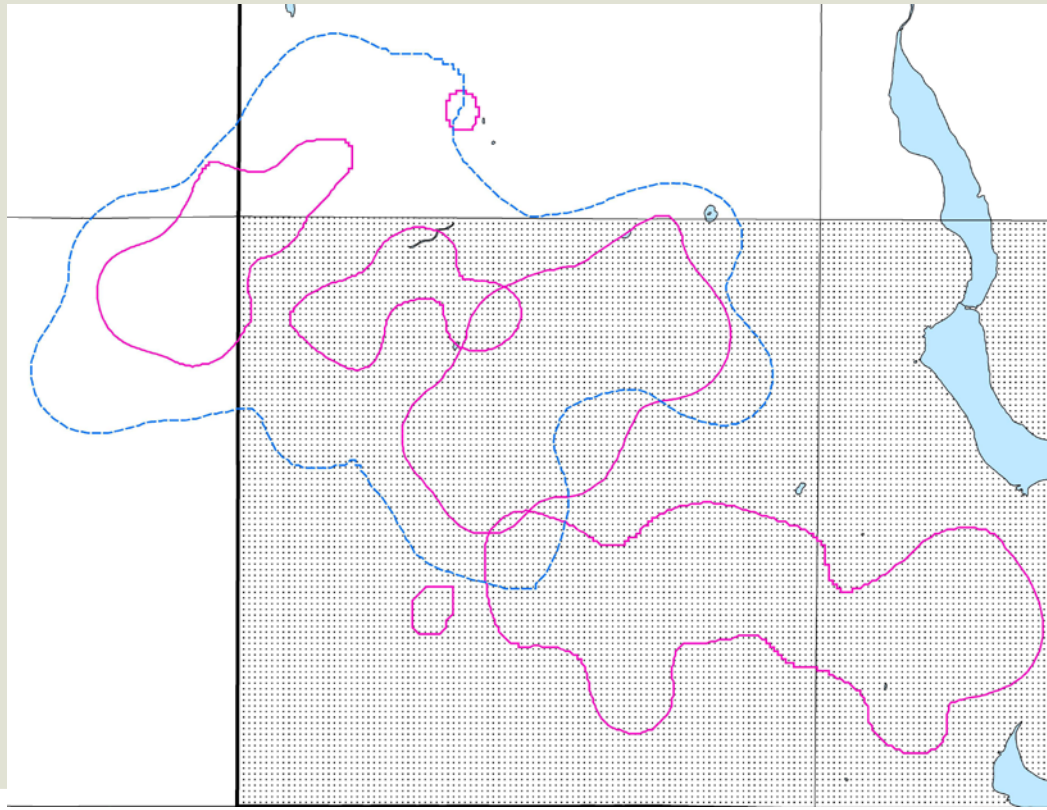


Budworm Impacted  
46% s/f clear cuts



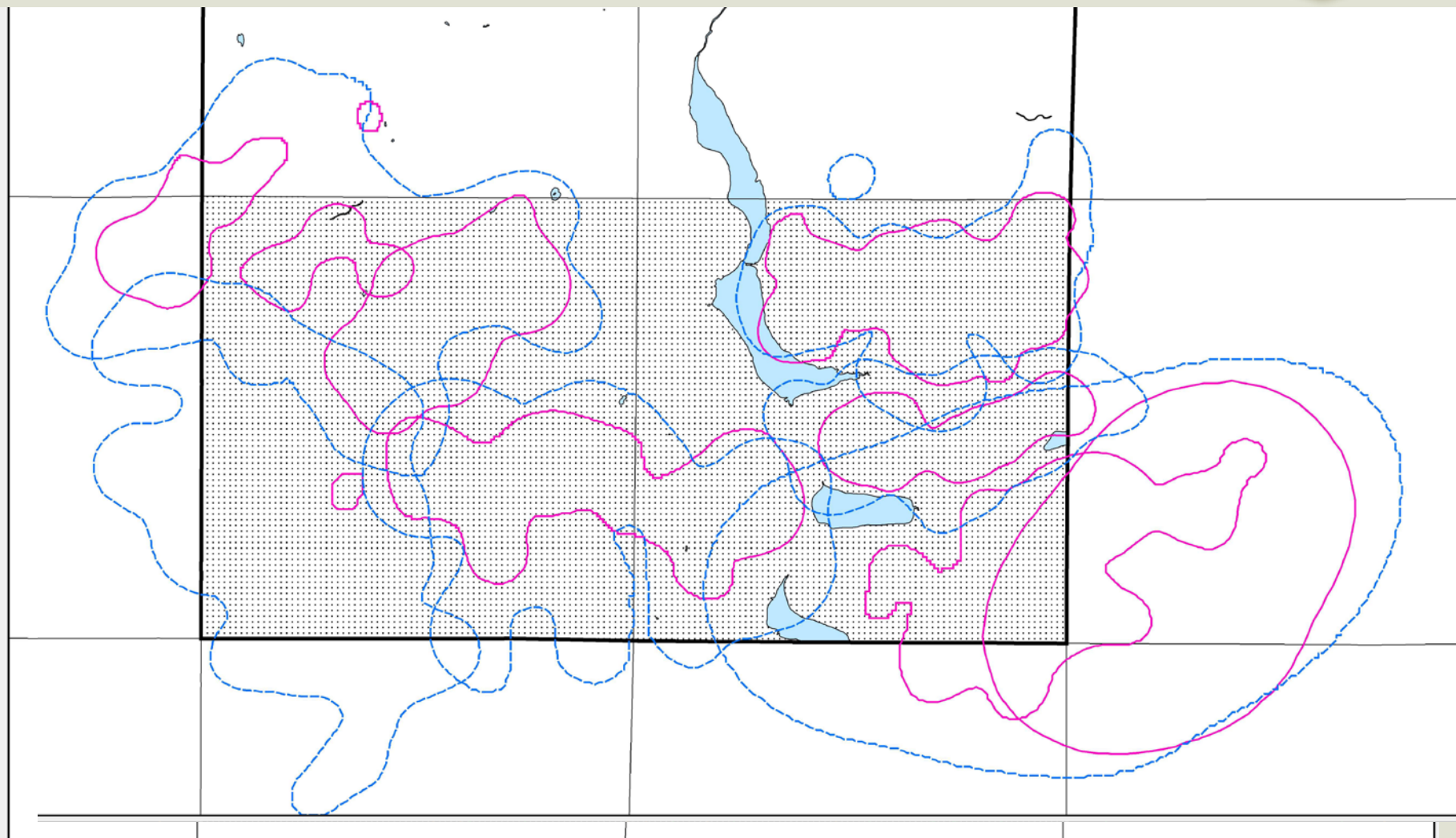
# Radio Telemetry Study : 1999–2011

- Home range : 25 km<sup>2</sup> F, 50 km<sup>2</sup> M
- Male home range overlaps 3 females





# Radio Telemetry Study : 1999–2011





# Radio Telemetry Study : 1999–2011



- Habitat Use – Selection for S/F sapling forest
  - 1,800–2,300 acres in Female HR
  - 3,000 –4,000 acres in Male HR



# Radio Telemetry Study: 1999–2011



- Population demographics

- 65% of adult females with kittens
- Average litter size: 2.63 (range 1–5)
- Kitten Survival: 78%
- Annual Adult Survival: 76% (SE=3.37)
  - Predation
  - Starvation–lungworm



# Reproduction: Lynx Study Area (400km<sup>2</sup>)



Year	AF	# Litters	Productivity	Hares/Ha	
				in CC	in SHW
1999	1	1	100%		
2000	3	3	100%		
2001	4	4	100%	2.22	
2002	9	9	100%	1.8	
2003	7	6	86%	1.85	
2004	9	7	78%	1.79	
2005	5	4	80%	1.92	0.87
2006	7	1	14%	1.19	0.97
2007	7	2	29%	0.99	0.65
2008	4	0	0%	0.8	0.66
2009	4	0	0%	0.75	0.64
2010	5	5	100%	0.91	0.96
2011	1	1	100%	1	1.31



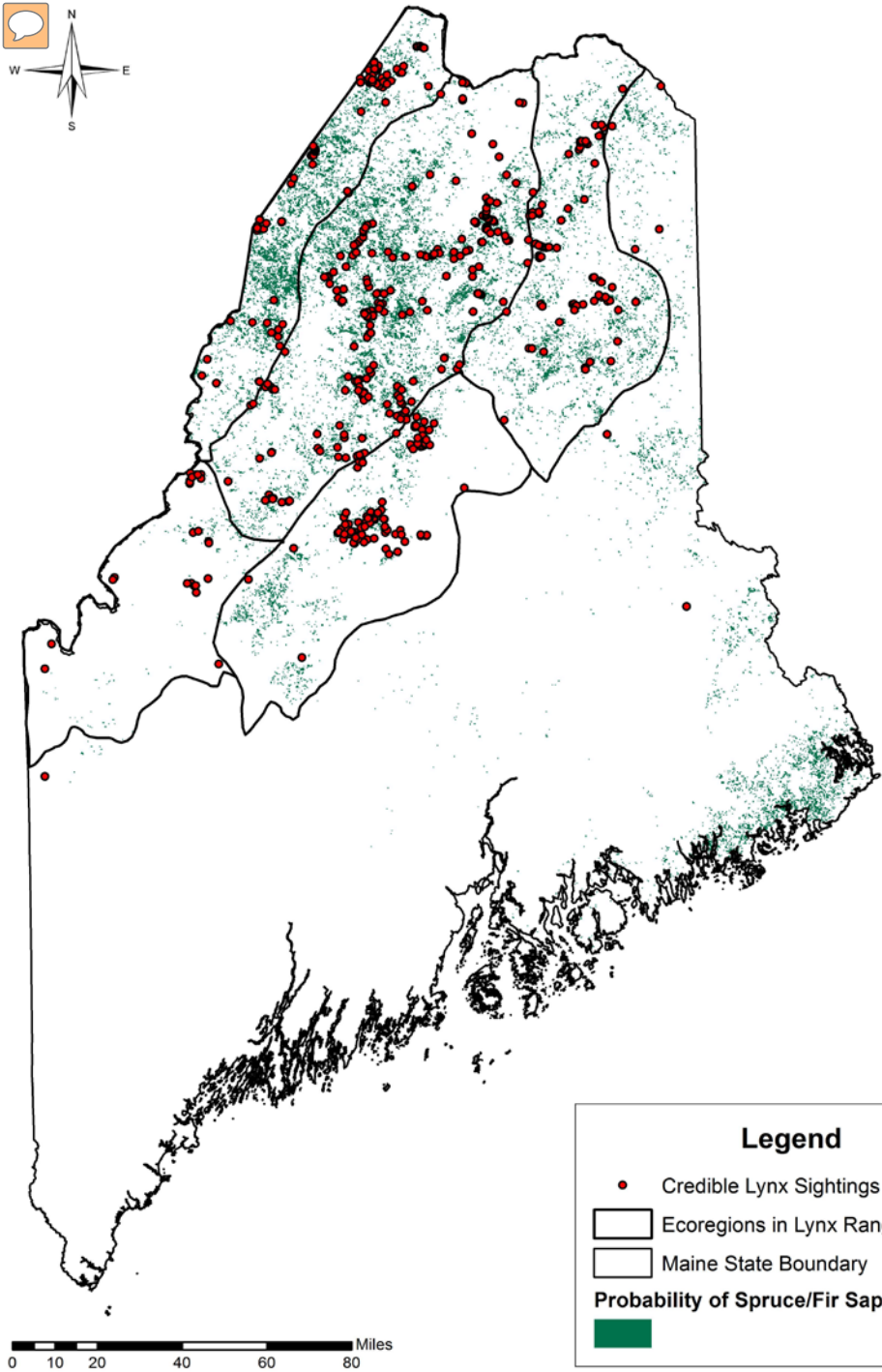


# Population Estimate



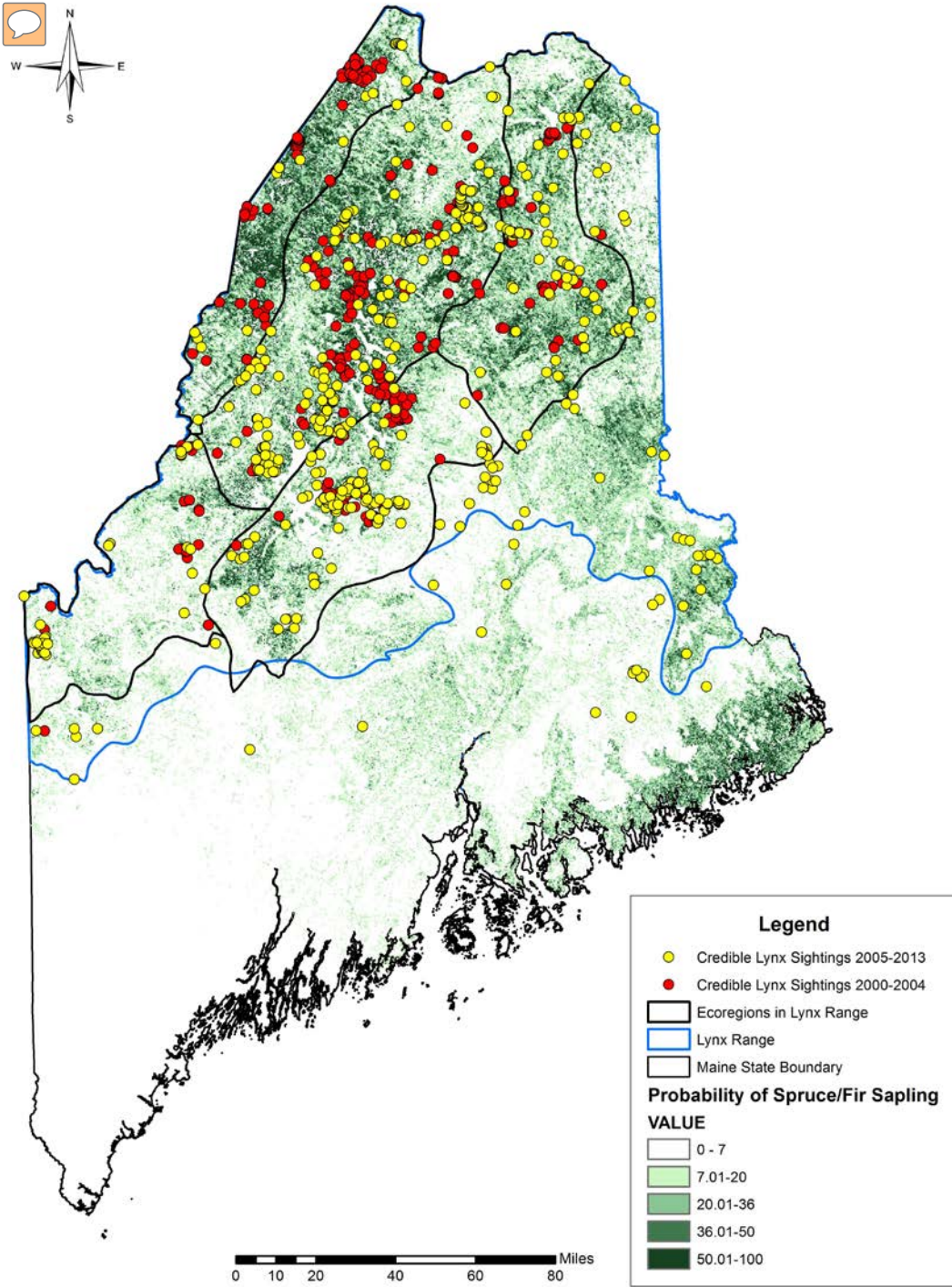
- Available lynx habitat in northern Maine – FIA
- Proportion of habitat occupied – track surveys
- Amount of lynx in occupied areas – habitat in h.r.

See Appendix IV – Maine’s Lynx Assessment

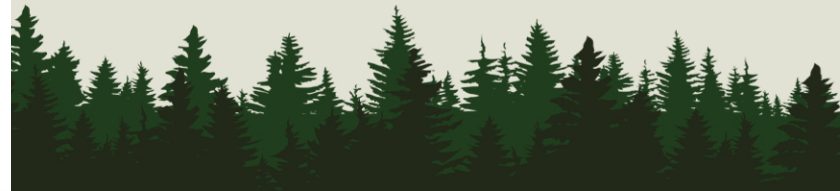


2006 Population Estimate  
 750 – 1,000 Adult Lynx





2015 Population Estimate  
 > 1,000 Adult Lynx





# Credible Sightings

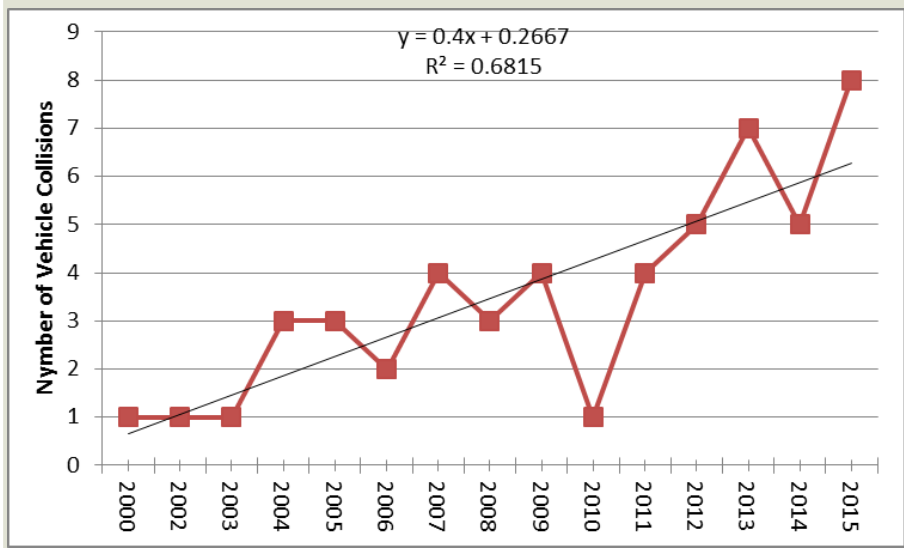




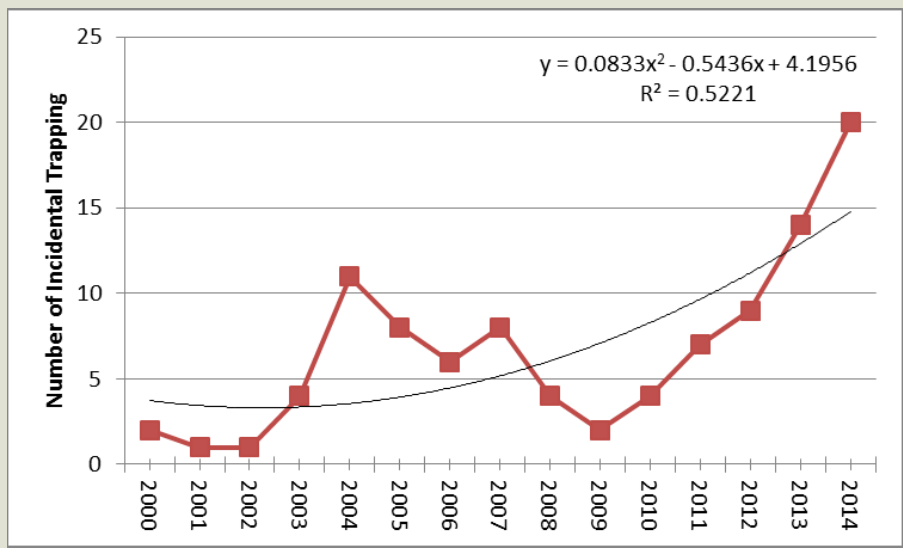
# Indices suggest Maine's lynx pop still increasing



## Road Mortalities



## Incidental Captures in Traps





# Periodic Winter Track Surveys



- Snowmobile 55–80 km Unplowed Roads / 100km<sup>2</sup>
- 24–72 hrs. after snow/wind event
- GPS survey route and track intercepts
- Collect additional data at track
  - Photograph
  - Measurements
  - Assign STQ
  - Number of Individuals
  - Direction of Travel



IFW Regions

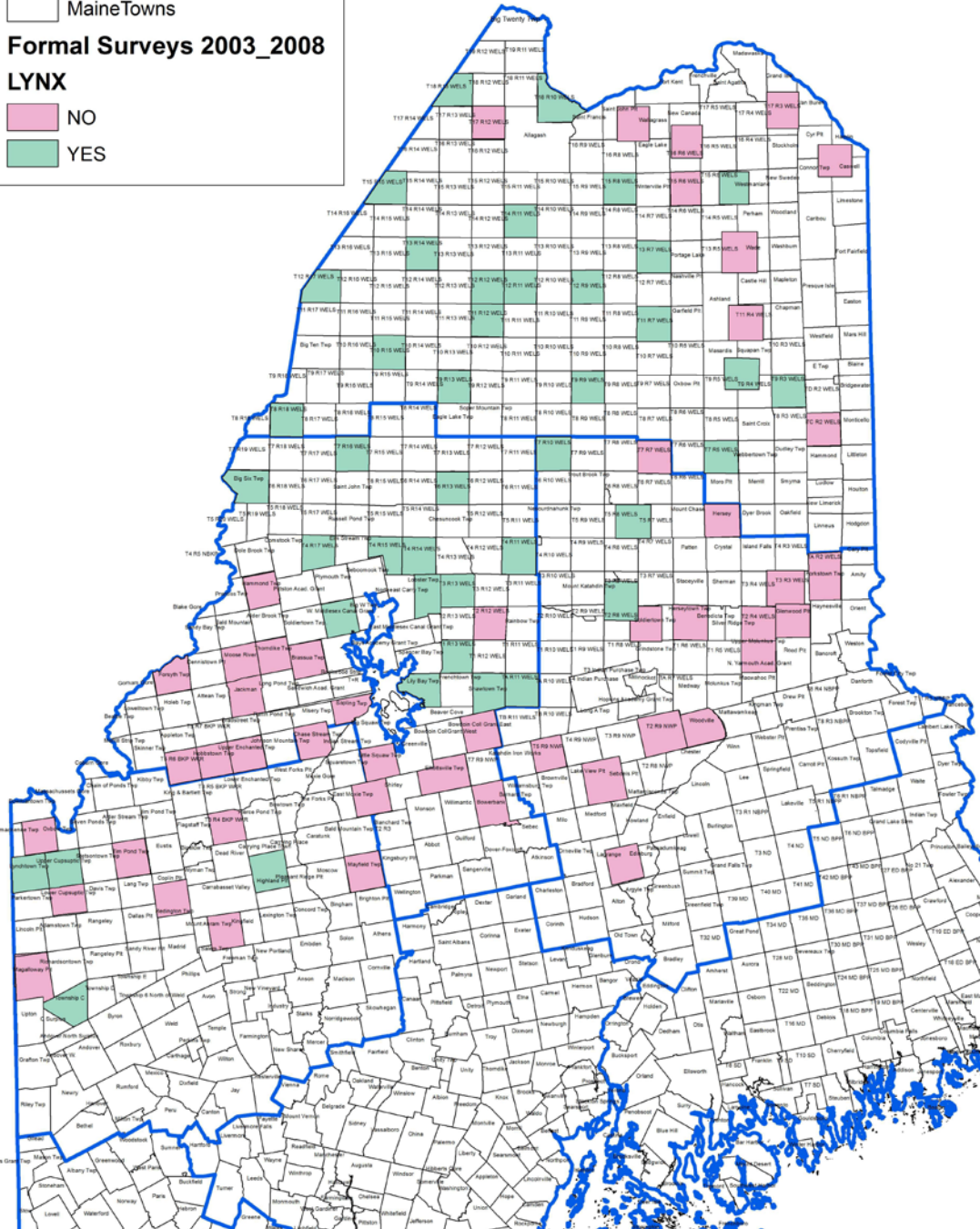
Maine Towns

### Formal Surveys 2003\_2008

LYNX

NO

YES



**Legend**

IFW Regions

MaineTowns

TownsWithLynxTracks2015

**Formal Surveys 2015**

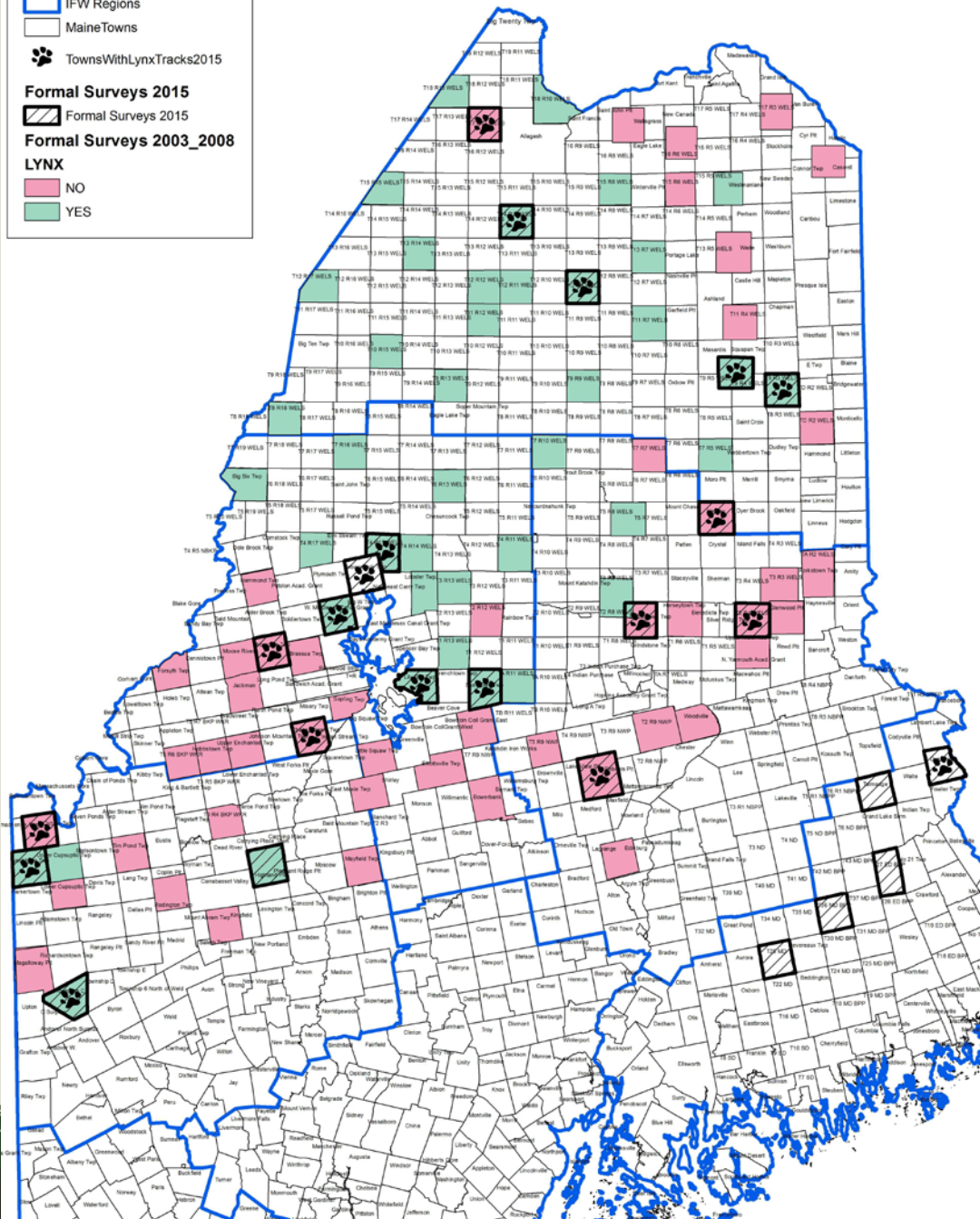
Formal Surveys 2015

Formal Surveys 2003\_2008

**LYNX**

NO

YES





# Monitoring Lynx – Track Surveys

Time period	Number of towns surveyed	Number of towns with lynx	% occupied
1995–1998	116	10	9%
2003–2008	91	43	47%
2015	24	19	79%

19 towns surveyed in 2003–08 and 2015

Time period	Number of towns surveyed	Number of towns with lynx	% occupied
2003–2008	19	11	58%
2015	19	18	95%





# Preliminary Occupancy Models

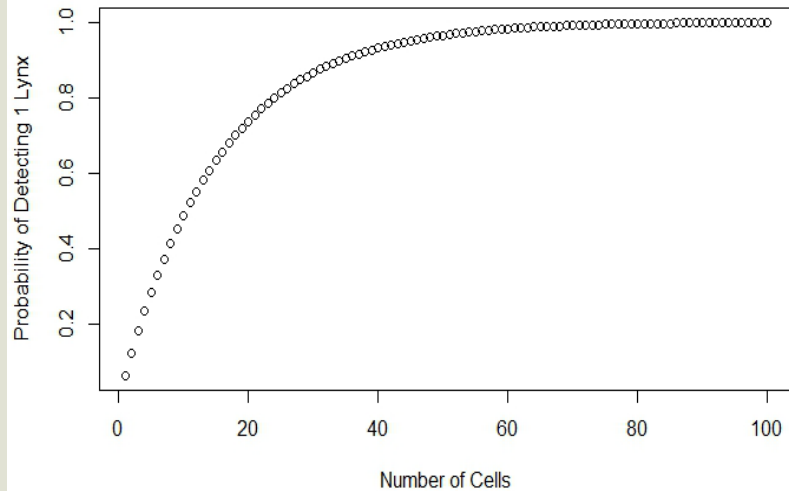
2003

Naïve estimate: 17/19 towns

$$\Psi = 0.897 \pm 0.07 \text{ SE}$$

*Mean Detection rates:*

$$p = 0.065 \pm 0.007 \text{ SE}$$



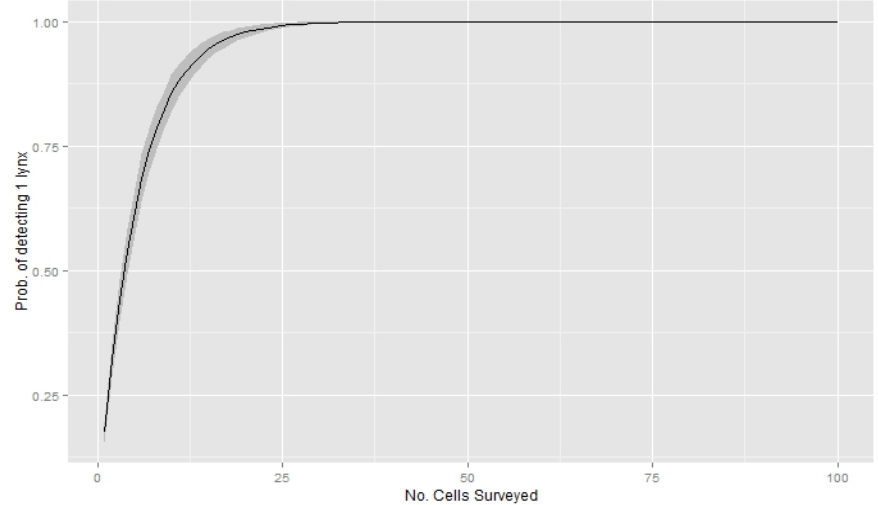
2015

Naïve estimate: 18/19 towns

$$\Psi = 0.951 \pm 0.05 \text{ SE}$$

*Mean Detection rates:*

$$p = 0.176 \pm 0.010 \text{ SE}$$



**Legend**

IFW Regions

MaineTowns

TownsWithLynxTracks2015

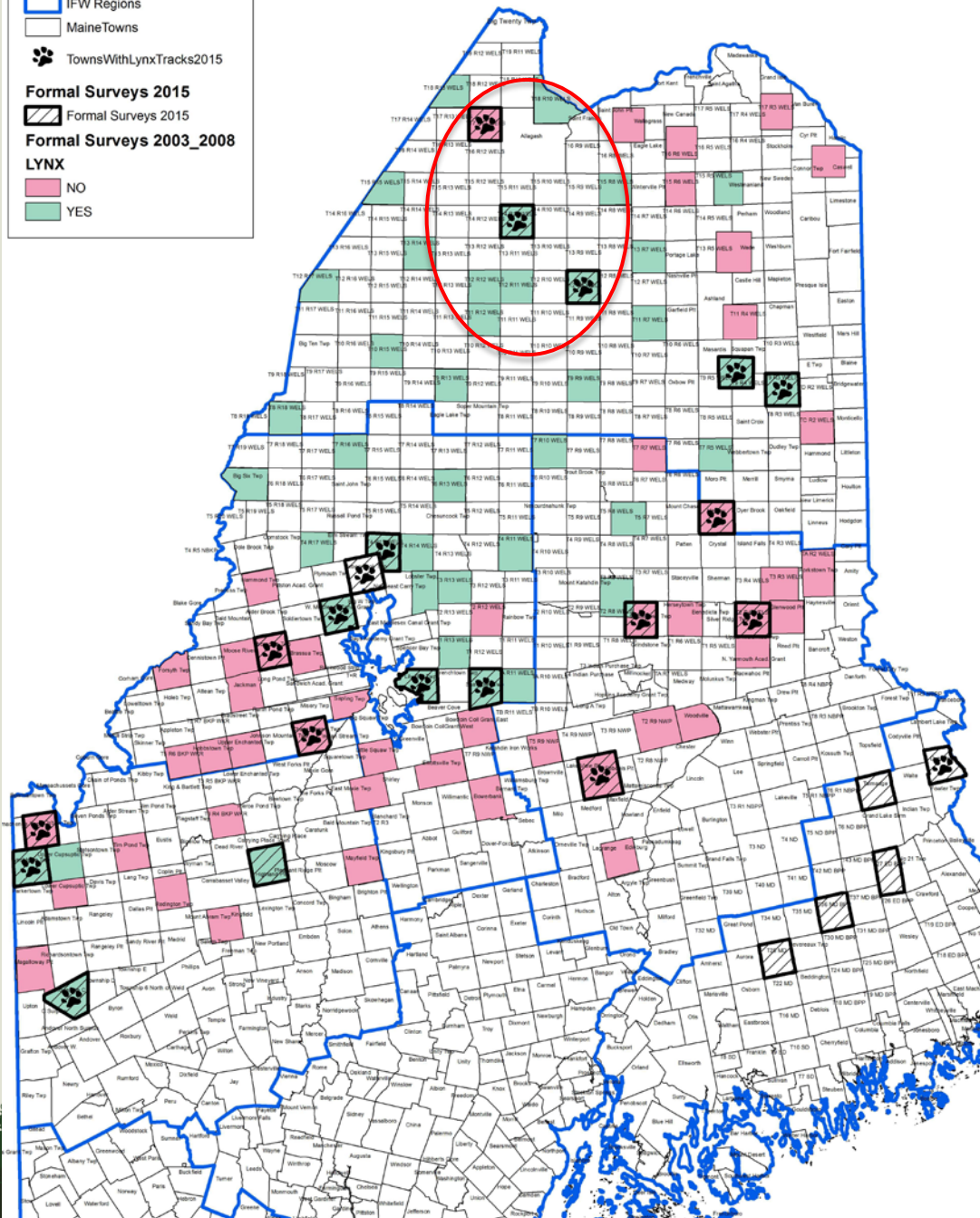
**Formal Surveys 2015**

Formal Surveys 2015

**Formal Surveys 2003\_2008**

**LYNX**

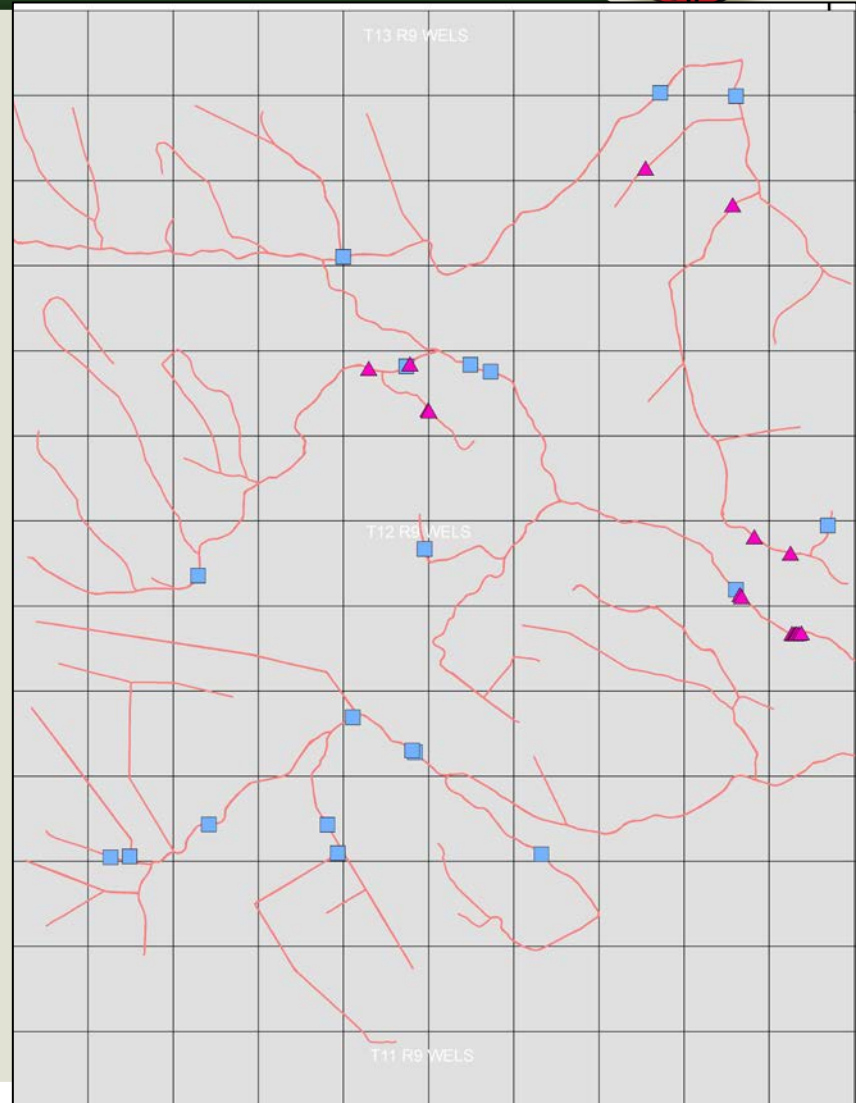
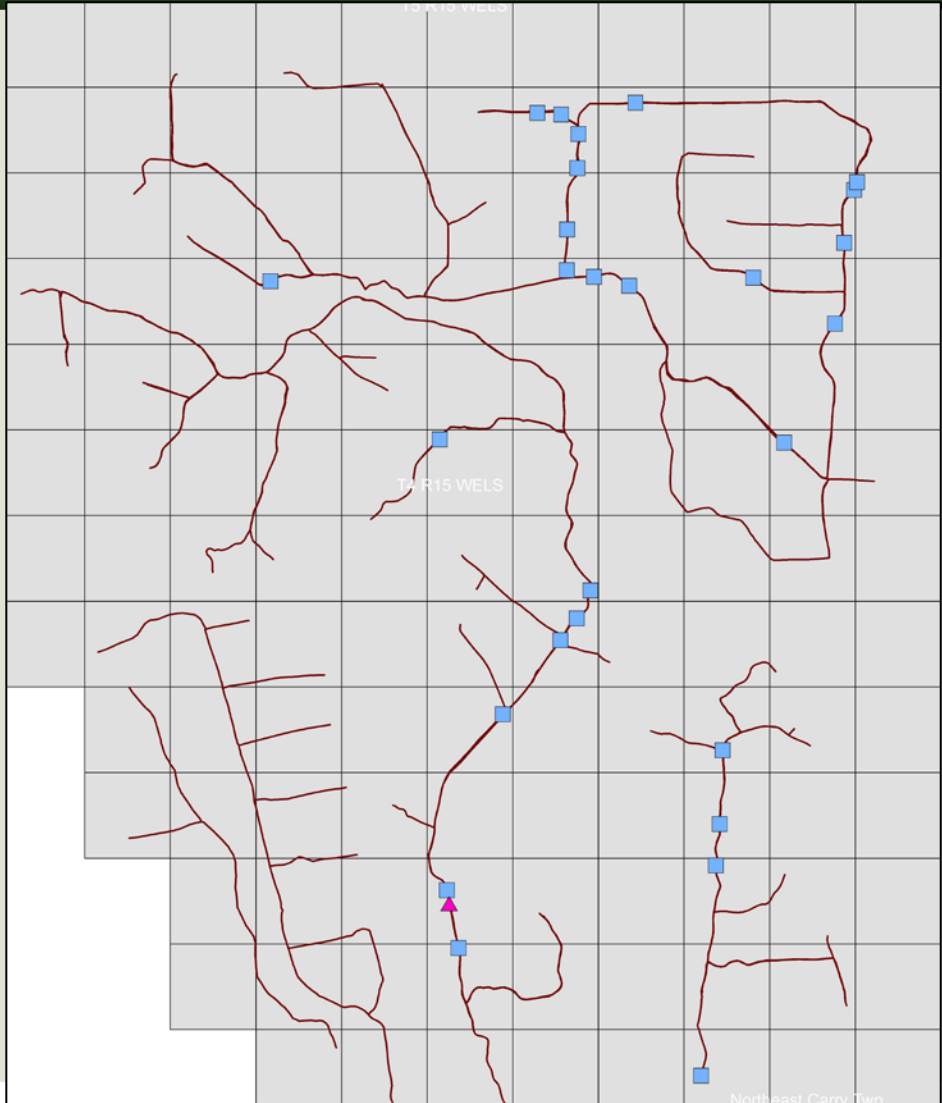
NO  
YES





# Detection Higher 2015

▲ = 2003 tracks    ■ = 2015 tracks

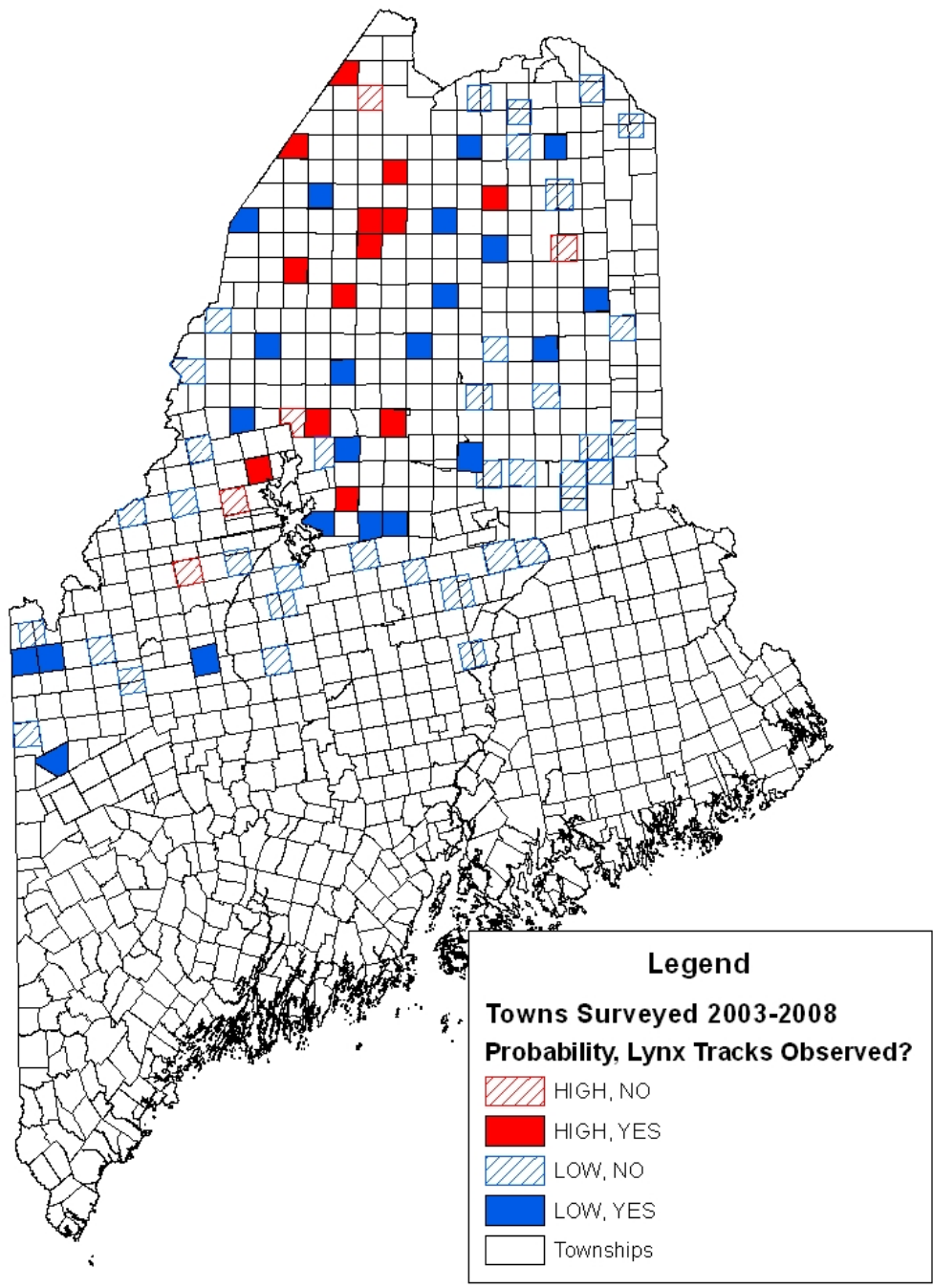






# Future Surveys

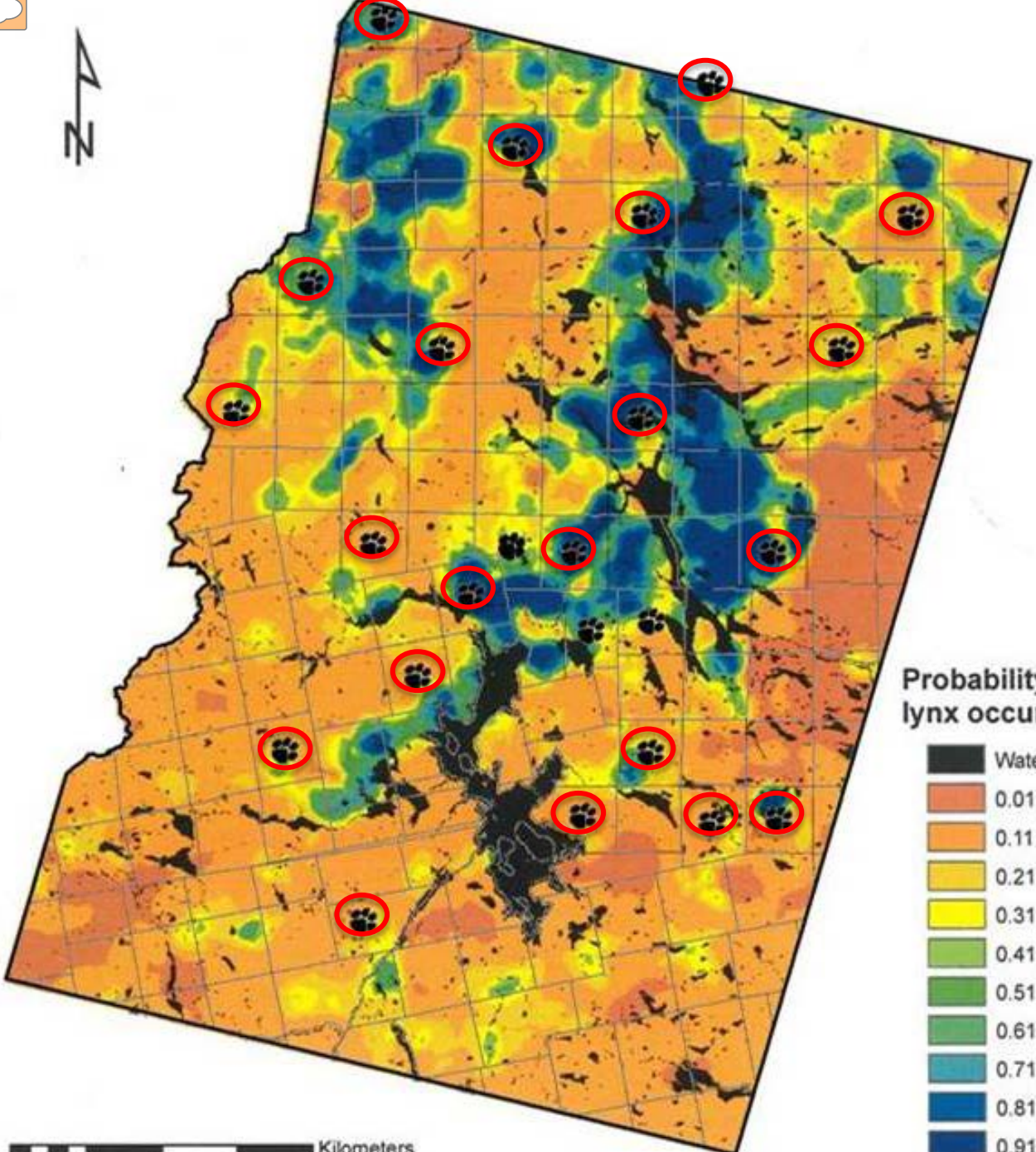
- Surveys to continue 2016 and 2017
  - Resurvey areas previously surveyed
  - 25 towns each year for 3–4 years.
  - Same survey design
- Occupancy modeling –
  - Has Occupancy Increased (i.e., expanding)?
  - Has Prob. Of Detecting Lynx Increased?
  - Has density/pop increased?



## 2003-08 Track surveys

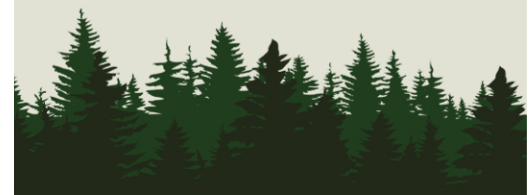
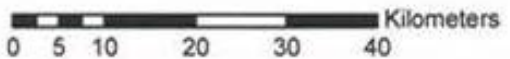
Found lynx in

- 22 of 55 Low Probability
- 13 of 18 High Probability



Probability of lynx occurrence

- Water
- 0.01 - 0.1
- 0.11 - 0.2
- 0.21 - 0.3
- 0.31 - 0.4
- 0.41 - 0.5
- 0.51 - 0.6
- 0.61 - 0.7
- 0.71 - 0.8
- 0.81 - 0.9
- 0.91 - 1.00





# Current Models:



## Data

- From colonizing population of lynx that occupied best habitat first
- Limited data on value of Partial Harvest
  - Most of s/f forest cut in 1980s
  - PH in remaining smaller patches of s/f or mixed forest



# Future



- Another Budworm Outbreak on Horizon
- FPA – allowances for larger clearcuts
  - Wildlife Value
  - Response to disease
- Will PH in maturing s/f forest provide adequate habitat for hares and lynx?

# Shelterwoods –emulate clear cuts

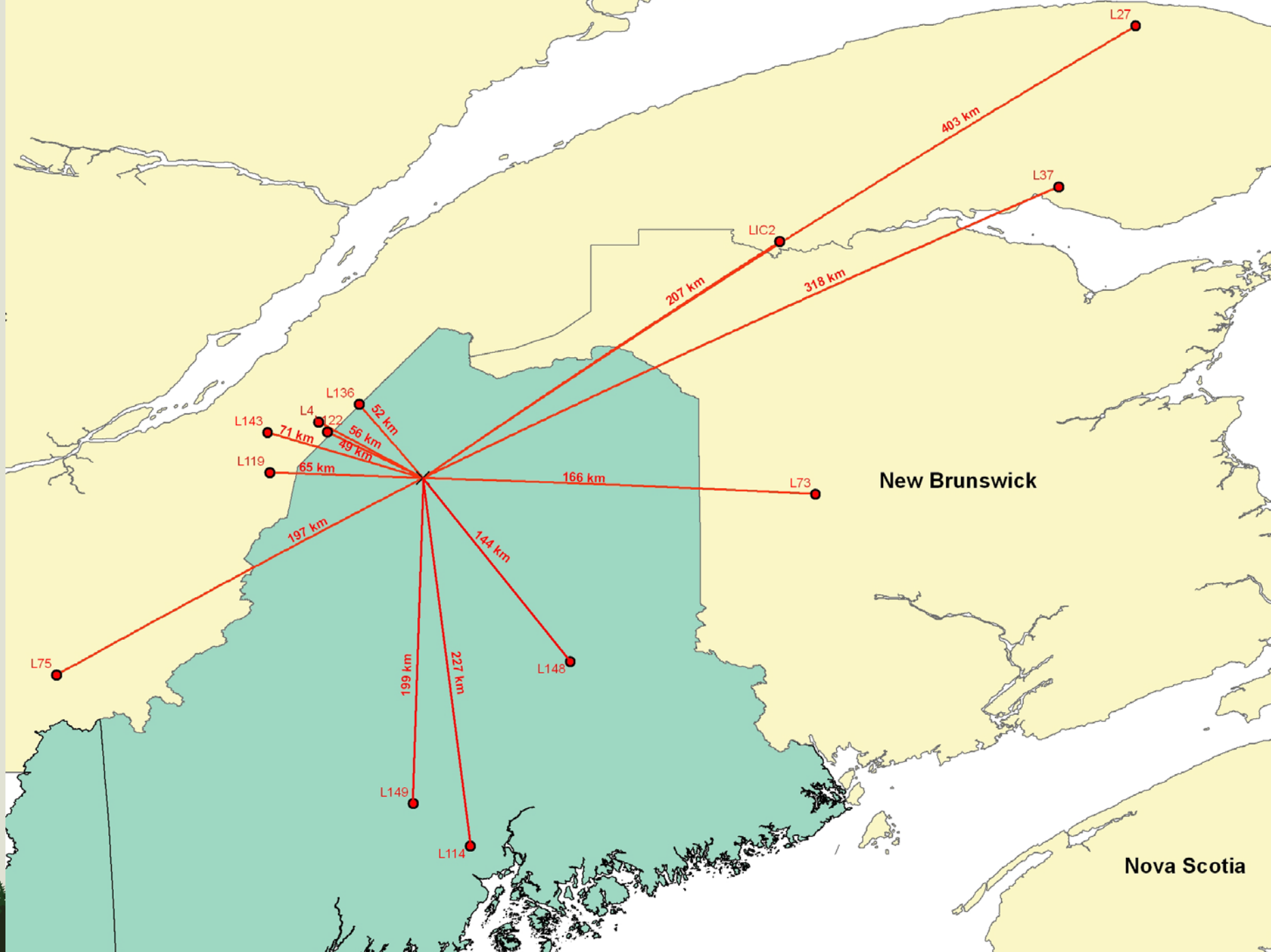




# Summary



- Maine's lynx population is robust
- Populations are still increasing
- Forest disturbance benefit lynx
- Land Use Regulations did not lead to current conditions
- Provide private land managers forest stand characteristics that support hares and lynx



New Brunswick

Nova Scotia